WHAT IS CLAIMED IS:

1. A method of interventional surgery comprising:

inserting an actuator within a body of a vascularized organism and positioning the actuator adjacent a target region within a vessel of the body;

operating the actuator to cause a needle thereof to move in a substantially perpendicular direction relative to a wall of the vessel to produce an opening therein; and

delivering a therapeutic or diagnostic agent from the needle to the target region via the opening in the wall of the vessel.

2. The method of claim 1 further including supplying an activating fluid to the actuator to cause movement of the needle.

3. The method of claim 2 further including removing the activating fluid from the actuator to cause the needle to be withdrawn from the vessel wall.

4. The method of claim 1 wherein the therapeutic agent is selected from the group consisting of: an inorganic pharmacological agent; an organic pharmacological agent; a cell with a treatment function including an undifferentiated, partially differentiated, or fully differentiated stem cell, an islet cell, or a genetically altered cell; and an organic genetic material including a gene, a chromosome, a plasmid, DNA, RNA, mRNA, rRNA, tRNA, synthetic RNA, or synthetic DNA.

5. The method of claim 1 wherein the diagnostic agent is selected from the group consisting of: a contrast medium, a radioactive marker, a fluorescent marker, an antibody marker, and an enzyme marker.

6. A method of interventional surgery comprising:

inserting an actuator within a body of a vascularized organism and stopping the actuator adjacent a target region within a vessel of the vasculature of the body, the actuator including an

expandable section incorporating a needle, the actuator being operable between an unactuated condition in which the expandable section is in a furled state and an actuated condition in which the expandable section is in an unfurled state; and

causing the expandable section to change from the furled state to the unfurled state, to cause the needle to move in a substantially perpendicular direction relative to a wall of the vessel to produce an opening therein.

7. The method of claim 6 further including delivering a therapeutic or diagnostic agent from the needle to the target region via the opening in the wall of the vessel.

8. The method of claim 6 wherein the causing step includes supply an activating fluid to the actuator, and further including removing the activating fluid from the actuator to cause the expandable section to return to the furled state, thereby withdrawing the needle from the wall of the vessel.

9. The method of claim 6 wherein a proximal end of the actuator is joined to a lead end of a therapeutic catheter.

10. The method of claim 9 wherein a distal end of the actuator is joined to a tip end of the therapeutic catheter.

11. A method of interventional surgery comprising:

inserting an actuator within a body of a vascularized organism and stopping the actuator adjacent a target region within a vessel of the vasculature of the body, the actuator including an actuator body having a distal end and a proximal end, a central expandable section including a needle and located between the distal end and the proximal end, the actuator being operable between an unactuated condition in which the expandable section is in a furled state and an actuated condition in which the expandable section is in an unfurled state; and

operating the actuator to cause the expandable section to change from the furled state to the unfurled state such that the needle moves in an approximately perpendicular direction

relative to a central longitudinal axis of the actuator body from a position inside the actuator body to a position outside the actuator body.

12. A method of catheter-based interventional surgery comprising:

inserting and manipulating a distal end of a catheter within a body of a vascularized organism, the distal end of the catheter including an actuator;

positioning the actuator adjacent a target region of a vessel of the vasculature of the body and terminating movement of the distal end of the catheter;

operating the actuator to cause an expandable section thereof to change from a furled state to an unfurled state such that a microneedle at the expandable section moves in a substantially perpendicular direction relative to a wall of the vessel, from a position inside a body of the actuator to a position outside the body of the actuator, to produce an opening in the wall of the vessel.

13. The method of claim 12 wherein a proximal end of the actuator is attached to a lead end of the catheter.

14. The method of claim 13 wherein a distal end of the actuator is attached to a tip end of the catheter.

15. The method of claim 12 further including supplying a therapeutic or diagnostic agent from the microneedle to the target region via the opening in the wall of the vessel.

16. The method of claim 15 wherein an activating fluid is supplied to the actuator to cause the expandable section to change from the furled state to the unfurled state.

17. The method of claim 16 further including removing the activating fluid from the actuator to cause the expandable section to return to the furled state.

18. The method of claim 17 wherein the activating fluid is a liquid.

19. A method of interventional surgery comprising:

inserting an actuator within a body and stopping the actuator adjacent a target region within a vessel of the vasculature of the body, the actuator being operable between an unactuated condition in which an expandable section thereof is in a furled state and an actuated condition in which the expandable section is in an unfurled state, and a plurality of needles at the expandable section; and

operating the actuator to cause the expandable section to change from the furled state to the unfurled state such that the needles move in an approximately perpendicular direction relative to a central longitudinal axis of the actuator from a position inside the actuator to a position outside the actuator.

20. The method of claim 19 wherein the needles are spaced along a length of the expandable section.

21. The method of claim 20 wherein when the expandable section changes from the furled state to the unfurled state, the plurality of needles move at substantially the same time.

22. The method of claim 20 wherein when the expandable section changes from the furled state to the unfurled state, at least one of the plurality of needles moves before another one of the plurality of needles.

23. The method of claim 19 wherein when the expandable section changes from the furled state to the unfurled state, at least one of the plurality of needles moves in a direction that is different from the direction of movement of another one of the plurality of needles.

24. A method of interventional surgery comprising:

inserting an actuator within a body of a vascularized organism and stopping the actuator adjacent a target region within a vessel of the vasculature of the body, the actuator including an expandable section, the actuator being operable between an unactuated condition in which the expandable section is in a furled state and an actuated condition in which the expandable section is in an unfurled state, and a needle at the expandable section; and

operating the actuator to cause the expandable section to change from the furled state to the unfurled state such that the needle moves from a position inside the actuator to a position outside the actuator.

25. The method of claim 24 further including providing a plurality of needles at the expandable section such that at least one of the needles moves in a direction that is different from the direction of movement of another one of the needles.